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ABSTRACT

Videodisc technology could have a dramatic effect on the future of educational research by allowing users to access and manipulate the actual raw data in multiple ways. The supposed threat to traditional research methodologies is that there is apparently no systematic way for different viewers to reach the same conclusions about the same content. A possible solution is suggested by the research project, "Learning Constellations," in which "content granularity" is being built into the design of the videodisc and the user interface. Three case studies with elementary school children illustrate the use of content granularity, a way of defining the smallest meaningful unit of content for any section of material on the disc. It is a measure for setting a minimum grain size to ensure that the unit cannot be subdivided. Building a system where each unit is a thick enough description could enable the user to come closer to understanding the underlying intention of the action, event, or process. Thick description is using images, gestures, or sequences that convey meaning. In this way, conclusions, although not the same, will tend to fall into the same range, allowing traditionalists to acknowledge that videodisc technology deepens scientific inquiry about human theory making. (Author/SLD)

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VIDEODISC TECHNOLOGY AS A CONCEPTUAL RESEARCH TOOL FOR THE STUDY OF HUMAN THEORY MAKING

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Videodisc technology could have a dramatic effect on the future of educational research by allowing users to access and manipulate the actual 'raw' data in multiple ways. Users have the ability to examine the original documentation, make their own observations, and compile the data with new levels of interpretation. The supposed threat to traditional research methodologies is that there is apparently no systematic way for different viewers to reach the same conclusions about the same content. A possible solution being implemented in my videodisc project called "Learning Constellations" is that *content-granularity* is being built into the design of the videodisc and the user interface. Content-granularity is a way of defining the smallest meaningful unit of content for any section of material on the disc. It is a measure for setting a minimum grain size to ensure that the unit cannot be subdivided. Building a system where each unit is a *thick* enough *description* could enable the user to come closer to understanding the underlying intention of the action, event or process. As a result, conclusions, although not the same, will tend to fall into the same range, thereby allowing the traditionalists to acknowledge that videodisc technology deepens scientific inquiry about human theory making.

Thick Descriptions to Measure Meaningful Units

One of the obvious limitations in the doing of research is that the individual researcher makes an initial selection from a multitude of possibilities. In fact, this initial bias of what is significant and what is not starts an intricate web of layers of the researcher's interpretations. Videodisc technology will not remove the individual bias of the researcher, but it could give the user of the discs additional choices within an already selective learning environment to experience a more richly textured picture of the context, or as Clifford Geertz would say, to provide a *thicker description* of an act, event, or process.

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Thick descriptions are descriptions which are layered enough for readers/viewers to draw conclusions and uncover the intentions of a given act, event, or process. In a video environment, *thick descriptions* are images/gestures/sequences which convey meaning. Neither the quantity nor the resolution of the images make the descriptions thick. What creates thickness is the ability of the video image to transmit what is really being said. The reason for understanding the necessity of *thick descriptions* in an interactive videodisc environment is that they provide us with a way to articulate the meaning of what we see, and, they help us come to terms with one of the problems inherent in video as research - the fact that visual documentation tends to resist any kind of systematic evaluation and, like all interpretive approaches, is "imprisoned in its own immediacy or detail."[1]

In fact, what seems to be missing in the world of interactive videodiscs is an open-ended research environment which maintains the integrity of the original source material. We have yet to determine whether an interactive environment can allow the user to browse through research data on disc without misinterpreting the intention of the person or action recorded, or even the intention of the filmmaker. How to build systems so that users cannot put pieces of video side by side haphazardly and without limitations is the question. To answer this question we need to understand what makes a chunk of video a discrete chunk. When we put ethnographic material on disc in order to study individuals in their cultures, the chunks need to be *thick* enough so that the user is given an opportunity to come as close as possible to the original experience. [2] We can never expect that the user will experience that which the "native" experienced, but we do want to find ways to build systems which delineate the consistency of the smallest unit, or as it could be called, the *content-granularity*.

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[1]Clifford Geertz, *The Interpretation of Cultures*, p.24.

[2]What makes the chunk thick is the quality of the description. It depends on technical aspects only to the extent where the technique is a vehicle for transmitting the message inherent in the chunk. Gilbert Ryle, the Oxford scholar first termed the expression *thick descriptions* as a means of differentiating between what is really happening when the same action appears to be happening. For example, if there are five people sitting on a rock each with his hand on his chin, how do we know which of these persons is really the thinker of thoughts, *le Penseur*? In videoland, we would have to develop a system for the study of the same gesture which has different meanings even in the same context.

The Research Objective of the Video Data

During the past three years, I have conducted a video research study of three children in the computer culture at the Hennigan School, a multi-ethnic inner-city Boston public school. Under the guidance of Seymour Papert, researchers have conducted a variety of studies of the two hundred and fifty children who spend about an hour a day at the computers. Most of the time the children use Logo, a programming language designed by Papert and his colleagues.

In the beginning of my research, I 'took video' of what I understood to be significant to the kinds of theories I was (then) interested in studying - the educator as artist, the role of storytelling in theory making, styles of teaching, and epistemological styles of learning. In the meantime, (the camera and) I interacted with the children in ways that built a close relationship with them. From the video tapes of this very early phase of my research, my personal bias is reflected in the way I used the video camera to find out about the theories of individual children. Instead of avoiding this bias, I allowed my following work of building interactive videodiscs to develop the theme of theory making. I began to focus my attention on the intentions of the children through the stories and experiences they shared with me. With the added dimension of being influenced by the films of John Marshall and the writings of Clifford Geertz, I found myself doing something close to what may be called video ethnography.

The Bias of the Video Ethnographer

If we look at the ethnographer in a thick way, then we must do what the ethnographer does - reach broad conclusions from small, dense, textured pieces of information. Ethnographers begin their documentation by accepting the fact that what they record in their field notes is already an interpretation of an event. The recording of the event is, in some respect, 'fiction,' because it is a 'picture' of what the person who is participating in the event is experiencing. Moreover, the observer/recorder, by her presence in the environment, is affecting the culture within which she is collecting her data. [3]

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[3] Clifford Geertz, The Interpretation of Cultures, pp.10-20.

Readers of social science have a naive tendency to accept the results of researchers who have gone 'into the field' to do their studies without questioning the underlying biases of this initial phase of the documentation; they do not ask the following questions:

-When does the ethnographer put pencil to paper?

-When does the ethnographic filmmaker turn on the camera?

-What is selected to record? What is not?

-What is in the frame and what is not?

-What detail is focused on and what is excluded.

-What is experienced while the ethnographer is recording and looking through the viewfinder?

-What is not experienced of the event, the moment she starts the process of recording?

The fact is that research is a subjective and interpretive endeavor. Once we accept this, we can address the issue of how the ethnographic filmmaker/videodisc designer can provide users with meaningful slices of reality in her documentation of events in spite of the fact that what she records is an interpretation of an event.

It is my contention that understanding the bias or, to be less judgmental, the intention of the researcher helps users reach their own conclusions about the nature of a given research. In video and videodisc technology this is especially important because the individual chunks of data can be experienced as separate units and combined differently for different users. The role of the designer/researcher is to establish her "story" of what is happening and still give the user the freedom to move 'seamlessly' around the themes. Perhaps what I mean by "moving seamlessly around the themes" will become clearer by briefly describing my videodiscs, "Learning Constellations."

Learning Constellations - The Grouping of Chunks

In videodisc lingo, the term " seamlessness" refers to being able to edit together related chunks, which are placed in different parts of the disc, so that no visible glitch or black space is seen in the process of moving from one chunk to the next. If we think of this term in a more abstract way, it could mean transparency. What I am saying is that an aim in my design is to create an environment where users can explore thematic "stories" about children's theory making without the tool and its interface becoming an obstacle to their discovery process.

To date, many of the data-base systems available do not address this concern. Perhaps it is the nature of the approach of people to videodiscs and not a problem inherent in the system. If the concern is not a "how to" approach, but an open-ended "what more can we learn about the way we perceive this or that," maybe we could begin to find solutions to the problems of how much is enough and not too much, and, more importantly, how to create paths which allow a continual deepening of the experience without leading to an endless myriad of discrete, disjointed pieces.

The development of themes or thematic constellations relieves the burden of getting lost in the vastness of the video and written data. Therefore, a crucial stage in doing research with video technology is to create the right tool for sifting through the material. In the best of worlds, the video signal would be digitized as it is being taped, and an editing system would be computerized. Without the luxury of this next phase, creating a system for collating and analyzing the data is the next best. A rather easy to use and versatile tool is Hypercard. Each chunk of video or text can be described on a card (which I call a Star) and key words can group the related material to form thematic constellations.

What is especially exciting is that the material itself yields the themes. For example, in the using of this design tool, several broad themes emerge from the video material: children's inventing mental objects, the source of imagination, learning co-operatively, gestures as insights to styles of thinking, the games of girl-boy talk, questioning the need for curriculum, discipline - inner versus outer, what punishment means to different children, and storytelling as an aid for confronting fantasy and reality. By moving around these thematic constellations, the user of the disc will be able to make connections within the material or data which even I, the researcher and designer, may not see.

I chose the title "Learning Constellations" because stars group together differently from different perspectives in the universe. The linking of one set of stars to another is dependent on whether one is here on Earth or in another galaxy. It is neither our fault nor our greatest attribute that we can see only from our own perspective.

The possibility of a non-linear environment is to travel to different frames of reference and to experience the same set of star chunks in new ways. This is not to say that this technology will enable every user to see things that were unseen to the linear eye, but it does open the original material to a different kind of scrutiny. By this statement, I am implying that not only can a user question what she thought she understood from one slice or grouping of sequences, but also one user can question what another user has understood and demand it be substantiated.

Reaching Broad Conclusions

The aim of the design of the videodiscs is that the themes act as guides for the user to establish a set of conclusions. Since every user will access the data differently and will view even the same data through different eyes, the thickness of the description of the act, event, or process will provide a measure to ensure that conclusions, although not the same, fall in the same range. To build thick descriptions one can begin by building up from the smallest unit of meaningful content. Whether this be a wink, a word, or constructing a program in Logo, this content-granularity is decided by examining the original purpose of the person who winked, spoke, or wrote a program. Because researchers are bound by their own webs of interpretation, conclusions will be both limited and enriched by the researchers' experiences. What researchers can do in this hyper-media is to show thick slices of what they observed. In other words, they can shape the material on the discs to let the user come close to their interpretation of the he intention of the 'subject.'

The slice of Adrian is perhaps the most illustrative of the issues discussed in this paper. Adrian loved my videotaping him. He would tell me stories of a boy who flew to the planets, and about the duck who got fat/pregnant and had an ugly duckling who was hated by all his brothers and sisters. He often told me about journals he was writing, about his mother's aspirations for him, and his plans to be a professor. Once he told me how "memory in the computer is just like the memory in the mind. Only a kid, unlike adults, never forgets, not for at least two years. The computer can only remember for about a year." My initial interpretation was that Adrian is a very articulate child and an exceptionally good storyteller with a large fantasy life.

Half a year later, I met with and videotaped Adrian's teacher, Linda Moriarty. It seems that the story thickens as she tells me (on tape) about Adrian the liar; Adrian the child who threatened Michael with a knife; Adrian who told the class he was named after a famous basketball player because he was so good in basketball. (One of the kids in class asked Adrian how his mother knew he would be good in basketball when he was just born. "Without missing a beat," [4] Adrian answered that he was called "Baby A" for the first five years of his life!)

In fact, the slice on Adrian for the videodisc covers many subjects: Adrian at the computer, Adrian in the classroom, Adrian and his friends, Adrian as seen through the eyes of various researchers, Adrian on Adrian, etc. The slice I created in this non-linear medium is still a slice of the Adrian I got to know over a two year period.

My recent conclusions about Adrian are that he has a special ability to make stories. These stories can be called 'lies' for those who believe that ten year old children should have a complete separation between fantasy and reality. On the other hand, the idea I want to transmit to the users of this interactive medium, is that Adrian is a theory maker. He mentally lives the stories he creates as he tells them. He resolves the fears of an oppressively punitive parent, he finds confidence in himself as an interesting and unique person, and he, for a small moment, experiences the glow of glory. This constructed fantasy world would work well in a society less reality bound than is ours. For Adrian this has caused or been a factor in his separation from his mother who is now living with another man. He is now in a foster home. He has also been expelled from school due to pressure from the parents of other children.

Videodisc technology is not going to protect ten year old black children from the trials and tribulations of growing up in a rough inner-city environment. Nor will it give us a prescription for how to produce more children as curious as John, another of my research subjects. A tool is only a medium with which to build. If it is a good tool, then our ability to shape the world has increased. From the educational context, videodisc technology can be a tool for encouraging deeper analysis, a tool to share our experiences, and a tool with which to build conclusions.

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[4] Linda Moriarty in a video interview in my office summer of 1987.

Final Remarks

In editing the videodiscs, Adrian, John and Mandy have taken on new dimensions as people. Had I chosen to only write about them, my opinion would have been shaped many months ago. My conclusions about these children would be the only conclusions available to the reader. Adrian would be cast only as the storyteller, John as the amazing inventor, and Mandy, as the romantic dreamer. Each day of editing the material for the final pressing of the discs convinces me that there are no limits to the conclusions about the theory making of these children. They are full of the stuff of human experience which, on videodisc, does not allow one person or a thousand to reduce the richness of their theories to one conclusion.

As stated in the abstract, our conclusions about these individuals will probably fall in the same range with the safeguard of applying content-granularity, but the real challenge is to change our more traditional views of studying human theory making and accept the fact that what we will discover with this tool may be something very different from what we expected. We may find a way of describing and preserving the depth of the human experience. We may find that we can show others how to develop the inherited potential of the human spirit. Most importantly, we may now have a tool for ending the vicious cycle of testing people to assess their abilities.

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